

# Erhardt Winter Wheat

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Erhardt (PI 564761) is a hard red winter wheat developed by the Montana State University Agricultural Experiment Station. It was named in honor of Erhardt R. Hehn, who was the winter wheat breeder from 1948-1964 and Department Head from 1965-1971. The variety Erhardt was released because of its winter hardiness, yield potential and shorter plant height.

## Origin and Development

Erhardt was developed from the cross Roughrider/MT6928. MT6928 was used in the cross because it is a high yielding semi-dwarf and Roughrider was used because of its high degree of winter hardiness. Foundation seed was released to certified seed producers for fall planting in 1996.

## Agronomic Characteristics

Erhardt is a mid-tall, white chaffed, awned, hard red winter wheat. The kernels are hard, red, long with a mid-sized germ and heavy brush. Kernel cheeks are round to angular, open crease and a rough seed coat texture. Erhardt is equal to Roughrider for winter hardiness. It heads two days later than Judith and Rocky, one day earlier than Tiber, Roughrider and Redwin. Erhardt heads two days earlier than Neeley and five days earlier than Norstar. It is resistant to lodging and moderately susceptible to grain shatter (Table 1).

## Disease and Insect Resistance

Erhardt is resistant to stem rust and the leaf spot complex. It is susceptible to the wheat stem sawfly, dwarf smut and stripe rust (Table 2). Erhardt is heterogeneous for resistance (more than 80 percent plants resistant) to the Great Plains biotype of Hessian fly based on seedling tests in the greenhouse at Manhattan, KS.

## Recommended Areas

Erhardt is recommended for production in Districts 2, 3, 4, 5 and 6.

**Table 1. Agronomic comparisons of Erhardt with seven other hard red winter wheat varieties grown under Montana conditions (1989-1995).**

Variety	Winter hardiness <sup>1</sup>	Approx heading date (June)	Plant height (in.)	Lodging <sup>2</sup>	Grain shatter <sup>2</sup>
Erhardt	4	11	33	R	MS
Judith	3	9	35	R	M
Neeley	3	13	35	MR	S
Norstar	5	16	41	S	MR
Redwin	3	12	37	VR	VR
Rocky	2	9	36	M	S
Roughrider	4	12	39	S	S
Tiber	3	12	37	VR	VR

<sup>1</sup>S=Best winter hardiness  
<sup>2</sup>R=resistant; M=moderate; S=susceptible

## Field Performance

Erhardt, on the average, yields 19 percent higher than Roughrider and 14 percent higher than Norstar (Table 3). Judith yields 9 percent and Neeley 7 percent more than Erhardt if winter injury is not a factor. Erhardt's test weight has been two pounds heavier than Judith and a pound heavier than Roughrider and Neeley. Its test weight has been equal to all the other varieties in Table 4.

## Quality Performance

Grain protein content of Erhardt is equivalent to the best winter wheat cultivars.

Erhardt yields more flour per bushel than Neeley, Rocky or Tiber. Erhardt has the quality

**Table 2. Disease and insect reaction of Erhardt compared to seven other hard red winter wheat varieties.<sup>1</sup>**

Variety	Sawfly	Dwarf smut	Stripe rust	Stem rust	Leaf spot complex	Wheat streak mosaic
Erhardt	S	S	S	R	R	S
Judith	S	S	MR	R	R	S
Neeley	S	S	R	S	MR	MS
Norstar	S	S	S	S	S	MS
Redwin	S	S	M	S	S	MS
Rocky	S	S	M	R	S	MS
Roughrider	S	S	S	R	S	S
Tiber	S	S	M	S	MR	MR

<sup>1</sup>S=susceptible; R=resistant; M=moderate

**Table 3. Comparable average yields (bu/acre, 60 lbs/bu) on dryland, comparing Erhardt to seven other hard red winter wheat varieties (1989-1995).**

Variety	Bozeman	Conrad	Havre	Huntley	Kalispell	Moccasin	Sidney	Average
Erhardt	78.3	61.9	41.1	58.3	92.5	36.7	50.7	59.9
Judith	83.6	65.4	42.9	61.1	106.0	49.4	50.1	65.5
Neeley	77.2	68.4	42.0	58.5	102.9	51.9	49.1	64.2
Norstar	58.2	56.9	37.3	51.0	73.5	41.5	51.5	52.4
Redwin	72.0	59.3	39.5	58.8	86.2	44.7	46.9	58.2
Rocky	77.1	65.1	44.0	58.3	91.3	46.5	49.7	61.7
Roughrider	58.4	52.7	37.3	51.0	65.5	37.4	47.9	50.0
Tiber	71.1	64.9	43.6	59.0	92.6	47.7	47.4	60.9

characteristics for flour yield, ash content, water absorption and dough stability that are acceptable to the milling and baking industry (Table 5).

**Table 4. Comparable average test weight (lbs/bu) on dryland, comparing Erhardt to seven other hard red winter wheat varieties (1989-1995).**

Variety	Bozeman	Conrad	Havre	Huntley	Kalispell	Moccasin	Sidney	Average
<b>Erhardt</b>	<b>61.9</b>	<b>62.3</b>	<b>58.7</b>	<b>60.0</b>	<b>60.3</b>	<b>60.9</b>	<b>61.7</b>	<b>60.8</b>
Judith	59.3	60.4	56.3	57.0	59.2	58.4	58.3	58.4
Neeley	60.9	60.9	57.2	58.3	60.0	59.9	59.9	59.5
Norstar	60.9	60.6	59.0	59.5	58.1	61.1	61.2	60.0
Redwin	61.8	61.2	59.3	59.9	59.9	61.0	61.2	60.6
Rocky	62.0	62.9	58.9	59.0	59.6	60.3	61.5	60.6
Roughrider	61.5	61.9	58.2	59.9	57.3	57.9	60.9	59.7
Tiber	61.4	61.6	59.8	59.6	59.7	60.8	61.2	60.6

**Table 5. Average milling, baking and other quality characteristics of Erhardt and seven other hard red winter wheat varieties.**

Variety	Flour		Farinograph <sup>1</sup>	Baking data		
	Yield (%)	Ash (%)	Dough stability <sup>2</sup> (in minutes)	Wheat protein (%)	Water absorption <sup>3</sup> (%)	Loaf volume (cc)
<b>Erhardt</b>	<b>68.9</b>	<b>0.42</b>	<b>2.6</b>	<b>13.9</b>	<b>65.0</b>	<b>958</b>
Judith	68.2	0.41	3.2	13.1	65.9	976
Neeley	66.6	0.44	3.6	13.0	64.5	909
Norstar	69.6	0.41	3.1	13.2	62.1	966
Redwin	68.9	0.41	2.9	13.8	65.2	950
Rocky	67.2	0.45	4.1	13.0	64.6	873
Roughrider	69.7	0.48	2.6	13.9	64.6	969
Tiber	67.4	0.39	3.1	13.0	63.5	911

<sup>1</sup>Machine for measuring physical dough mixing properties of wheat flour.

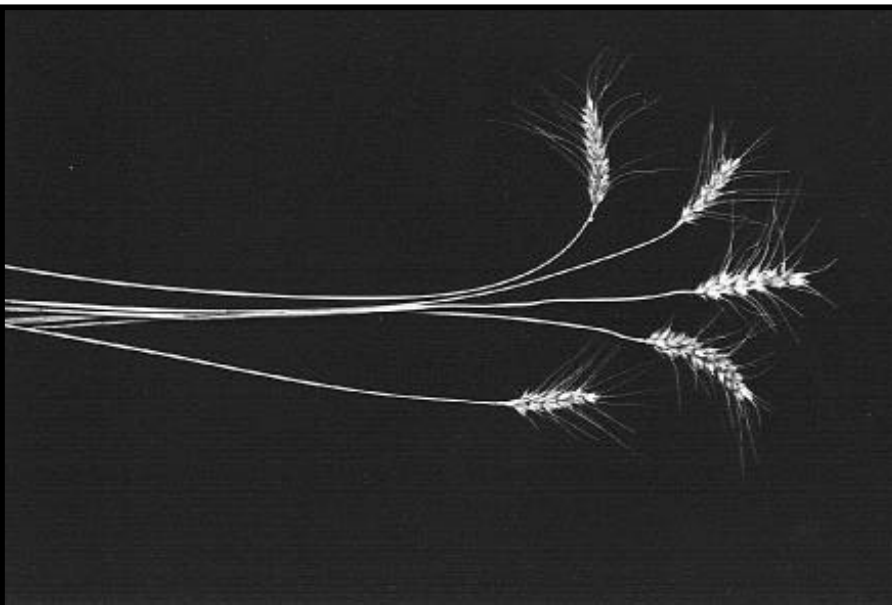
<sup>2</sup>Dough stability describes the length of time a wheat flour may be mixed before it breaks down.

<sup>3</sup>Water absorption: Bake absorption is the amount of water a flour sample requires to make a dough for optimum baking responses.

Source: MSU Cereal Quality Laboratory, Annual Report 1989-1994.

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